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THE INTERNATIONAL NOTATION for TAPPING SYSTEMS

(Revised Version: May 1940)

Summary

At the Conference of Directors of Rubber Research Organisations, held in Kuala Lumpur last February, certain amendments and additions to the International Tapping Notation were considered, and particularly the suggestion of Mr. J. J. H. Cronshey and Mr. C. Barclay of the Plantation Research Department of the United States Rubber Plantations, Sumatra, that the notation would be simplified by reducing its basis to a single convention.

After discussion, it was decided to submit a revised version to each of the organisations concerned with the recommendation that it should be substituted for the original version (Communication No. 240, J.R.R.I.M., Vol. 9, 1939, p. 164: also published in Archief voor de Rubbercultuur, Vol. 23, No. 4, 1939, p. 298 and in the Combined 3rd and 4th Quarterly Circulars for 1939 of the Rubber Research Scheme (Ceylon), Vol. 16, 1939, p. 111). The revised version which follows has now been formally approved by the Central Association of Experiment Stations in the Netherlands East Indies, the Rubber Research Scheme (Ceylon) and the Rubber Research Institute of Malaya, and will henceforth be used in place of the original in all publications of these organisations.

An article explaining the basis of revision, and outlining some provisional additions to the notation, precedes this revised version (Communication No. 246).

The Standard Notation (Revised, 1940)

The standard symbols to designate systems of tapping *Hevea* are now grouped as follows:

(1) number, type and length of cuts tapped on a tree at each tapping,

(2) tapping periods and cycles (includes "frequency"),

(3) number of successive panels, period and cycle of change (only required for "change-over" systems)

and (4) relative intensity.

The basis of the notation is to state amount of tapping as fraction of daily tapping on a full-circumference. An average of a quarter-cut tapped per day is taken as standard (100%) in the estimation of relative intensity.

(1) Number, Type and Length of Cuts

To be expressed as a fraction :

(a) the *numerator* to consist of a capital letter designating the *type* of cut,

S = spiral,
V = V,
L = extended-V (left arm of V extended upwards to full circumference)
and C = circumference (when types of cut are mixed or unspecified),

with a figure indicating the *number,* if more than one cut is tapped on a tree at each tapping;

and (b) the *denominator* to be the reciprocal of the fraction expressing the horizontal *length* of each cut in terms of the full circumference.

Examples:

S/1 = one full-spiral cut
S/2 = „ half-spiral „
S/3 = „ third-spiral „
S/4 = „ quarter-spiral cut
V/2 = „ half-V cut
2V/2 = two „ „ cuts
4V/2 = four „ „ „
2S/4 = two quarter-spiral cuts
L/1 = one extended-V cut (full circumference)
C/1 = one full-circumference cut (unspecified type)
C/2 = „ half-circumference „ „ „
2C/2 = two „ „ cuts „ „

(2) Tapping Periods and Cycles

To be expressed as a fraction or series of fractions, denoting " frequency " and/or " periodicity " :

(a) the *numerator* of each fraction to denote the *period* of tapping and *unit*;

and (b) the *denominator* to denote the length of *cycle* (of tapping *plus rest*) reckoned in the same units.

Units to be indicated by small letters :

d = days,
w = weeks,
m = months
and y = years.

Examples:

$d/1$ = *daily*
$d/2$ = *alternate-daily (one day in two)*
$d/3$ = *third-daily (one day in three)*
$d/4$ = *fourth-daily (one day in four)*
$2d/1$ = *twice daily*
$2w/4$ = *two weeks in four (two weeks in tapping, followed by two weeks' rest)*
$6m/9$ = *six months in nine (six months in tapping, followed by three months' rest)*
$m/2$ = *alternate-monthly (one month in tapping, followed by one month's rest)*
$0.5m/1$ = *alternate half-monthly (half month in tapping, followed by half-month's rest)*
$d/2,6m/9$ = *alternate-daily for six months in nine (six months of alternate-daily tapping followed by three months' rest)*
$d/1,m/2,12m/18$ = *daily for one month in two during twelve months out of eighteen (daily alternate-monthly tapping for twelve months, followed by six months' rest)*

Note: The distinction between "frequency" and "periodicity" has been eliminated in the revised notation by reducing the symbols to a common form. The denominator of the final fraction gives the full cyclic period of the system, whether "continuous" or "periodic."

(3) Number of Successive Panels, Period and Cycle of Change ("Change-Over" Systems)

To be designated, when required by a fraction *in brackets*:

(a) the *numerator* to indicate the *number* of successive panels (first), multiplied by the *period* (tapping plus rest) between each change of panels

and (b) the *denominator* to indicate the *cycle* of panel rotation.

Examples:

$(2 \times 2d/4)$ = *two panels, each in tapping for two days alternately (panel-cycle of four days)*
$(2 \times 16w/32)$ = *two panels, each in tapping for sixteen weeks alternately (panel-cycle of thirty-two weeks)*
$(3 \times 9m/27)$ = *three panels, each in tapping for nine months in rotation (panel-cycle of twenty-seven months)*

Note: (1) The numerical part inside the brackets always reduces to unity and so does not affect the calculation of relative intensity.

(2) Change-over symbols should be inserted after the fraction for tapping period and cycle to which they logically belong. For example, $d/2(2 \times 2d/4),6m/9$ would designate alternate-daily tapping on alternate panels for six months followed by three months' rest, whereas $d/2,6m/9\ (2 \times 9m/18)$ would designate alternate-daily tapping for six months out of nine, with the six-monthly tapping periods on alternate panels.

(4) Relative Intensity

To be expressed as *percentage* of intensity on the *standard system, half-spiral, alternate-daily tapping* (S/2,d/2,100%): that is the equivalent of a half-cut tapped on half the area—or an average of a quarter-cut per tree—on all days when there is tapping.

To calculate relative intensity multiply out the fractions in the formula (ignoring alphabetical symbols) and then multiply the product by 400.

Examples:

S/2,d/2..... $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$; *multiplied by* 400=100%.
(The product on the standard system is $\frac{1}{4}$, hence multiplication by 400 is required to express as percentage)

2V/2,d/3,5m/10..... $\frac{2}{2} \times \frac{1}{3} \times \frac{5}{10} = \frac{1}{6}$; *mult. by* 400=67%
(A "Sunderland" system: double-cut, third-daily, periodic tapping)

S/2,d/1,m/2,12m/18..... $\frac{1}{2} \times \frac{1}{1} \times \frac{1}{2} \times \frac{12}{18} = \frac{1}{6}$; *mult. by* 400=67%
(A periodic system used in Sumatra)

S/3,d/1,40d/80(3 x 80d/240)..... $\frac{1}{3} \times \frac{1}{1} \times \frac{40}{80} \times (\frac{240}{240}) = \frac{1}{6}$: *mult. by* 400=67%
(A periodic change-over system with three successive panels)

Some Examples of the Full Notation

Below are given the revised formulae for the twelve examples on pp. 167-168 of Communication No. 240, followed by the seven examples of change-over systems on p. 169 and one new example.

(1) V/2,d/2,100% = a half-V cut tapped alternate-daily.

(2) S/3,d/2,67% = a third-spiral cut tapped alternate-daily.

(3) S/2,d/2,12m/18,67% = a half-spiral cut tapped alternate-daily for twelve months in eighteen (twelve months in tapping followed by six months' rest).

(4) S/3,d/1,40d/60,89% = a third-spiral cut tapped daily for forty days in sixty (forty days in tapping followed by twenty days' rest).

(5) S/2,d/3,12m/16,50% = a half-spiral cut tapped every third day for twelve months in sixteen (twelve months in tapping followed by four months' rest).

(6) 2S/2,d/4,100% = two half-spiral cuts tapped every fourth day.

(7) 2V/2,d/3,5m/10,67% = two half-V cuts tapped every third day for five months in ten (five months in tapping followed by five months' rest).

(8) 2V/2,d/3,15w/25, 80% = two half-V cuts tapped every third day for fifteen weeks in twenty-five (fifteen weeks in tapping followed by ten weeks' rest).

(9) S/1,d/3,3m/4,100% = a full-spiral cut tapped every third day for three months in four (three months in tapping followed by one month's rest).

(10) L/1,d/4,100% = a full-circumference extended-V cut tapped every fourth day.

(11) S/2,d/1,m/2,12m/18,67% = a half-spiral cut tapped daily in alternate months for twelve months in eighteen (twelve months of daily-alternate-monthly tapping followed by six months' rest).

(12) 4V/2,d/2,400% = four half-V cuts tapped alternate daily.

(13) S/2,d/2(2×6m/12),100% = a half-spiral cut tapped alternate-daily with six months out of twelve on each of two alternate panels.

(14) S/2,d/2(2×2d/4),100% = a half-spiral cut tapped alternate-daily, with two days out of four on alternate panels (alternate tappings on alternate panels).

(15) S/3,d/2(3×6m/18),67% = a third-spiral cut tapped alternate-daily, with six months out of eighteen on each of three panels in rotation.

(16) S/2,d/2(2×2d/4)6m/9,67% = a half-spiral cut tapped alternate-daily, with two days out of four on alternate panels, for six months out of nine (alternate tappings on alternate panels for six months followed by three months' rest).

(17) S/2,d/2,6m/9(2×9m/18),67% = a half-spiral cut tapped alternate-daily for six months in nine, with nine months out of eighteen on alternate panels (six months in tapping followed by three months' rest on each of two alternate panels).

(18) S/2,d/1,2w/4(2×4w/8),100% = a half-spiral cut tapped daily for two weeks in four, with four weeks out of eight on alternate panels (two weeks in tapping followed by two weeks' rest on each of two alternate panels).

(18) 2S/2,d/2(2×2d/4),200% = double-cut change-over system: continuous alternate-daily tapping on two half-spiral cuts on the trees, but with alternate tappings on two pairs of alternating cuts—that is a system with four cuts on the trees of which only two are tapped at a time, such as is sometimes used in slaughter tapping.

(20) C/1,d/3,4m/6,89% = a full-circumference cut (of unspecified type) tapped third-daily for four months in six (four months in tapping followed by two months' rest).

Some Amplifications of the Notation

Multiple-cut Systems

Where it is particularly desired to indicate the position of the cuts in a double-cut or multiple-cut system, the fractions denoting individual cuts can be written in full, using the following conventional signs :

// = cuts in echelon on adjacent panels,
\+ = „ on opposite sides of the tree,
and − = „ superimposed one above the other on the same panel.

Examples:

S/4//S/4/,d/2,100% = two quarter-spiral cuts in echelon, both tapped alternate-daily. (This could be simplified to 2S/4,d/2)

S/4+S/4,d/2,100% = two quarter-spiral cuts on opposite panels, both tapped alternate-daily. (Also = 2S/4,d/2)

V/2—V/2,d/2,200% = two half-V superimposed cuts both tapped alternate-daily (=2V/2,d/2 — a form of slaughter tapping)

V/2—V/2+V/2—V/2,d/2,400% = four half-V cuts (two superimposed on each of the two opposite panels), all tapped alternate-daily (=4V/2,d/2 — a more drastic form of slaughter tapping)

Note : In calculating relative intensity, the fractions separated by the conventional symbols //, + or − must be *added* together and the *sum* multiplied by the other fractions of the formula (frequency, periodicity etc.); the same result will then be obtained as if the simplified formula (in brackets above) is used in the calculation. (The symbols are conventional : they should *not* be interpreted as the mathematical signs plus and minus).

Amount of Tapping

The amount of tapping in a given period may be reckoned as the product of length of cut by number of tappings, expressed in *circumference units* (circs.)

Examples:

85 *taps. on full-circumf.* (340.0 *quarter-cuts*) = 85.0 *circs.*
167 „ „ *half-circumf.* (334.0 „ „) = 83.5 „
167 „ „ *third-circum.* (222.7 „ „) = 55.7 „
324 „ „ *quarter-circ.* (324.0 „ „) = 81.0 „

Note: (1) Amount of tapping is expressed in full-circumference units, but it is convenient also to reckon the number of quarter-cuts for estimation of the *rate* of tapping (intensity). On this scale the system selected as standard (S/2,d/2,100%) realises an average of one quarter-cut per day.

(2) Calculation of amount of tapping on commercial areas should be based on *average* number of tappings *per tree*, so as to correct for vacant tasks. Average number of tappings may be determined over any given period by dividing total tapper-days by total number of tasks *overall* (that is inclusive of tasks in resting areas as well as those in tapping).

Potential Intensity

Potential intensity is the maximum daily *rate of tapping* produced by a system, when there is tapping every day.

The potential intensity of the system arbitrarily selected as standard (= 100%, vide sect. (4), p.29) is a daily tapping *rate* of *one quarter-cut per day*.

Actual Intensity

Actual intensity is the *amount* of tapping actually *realised per day*. It falls short of the potential intensity of the system by reason of days lost through weather, holidays etc.

The tapping formula may be amplified, if desired, to describe past performance by appending either the number of units tapped or the actual intensity realised over a given period.

For example, when tabulating results from a year's tapping (365 days) on the half-spiral alternate-daily system, with an average of 167.3 tappings per tree, the following amplified formula could be recorded:

S/2,d/2,100% (0.92 quarter-cuts per day = 83.65 circs.)

The first figure within the bracket allows ready comparison between the actual rate of tapping (0.92) and the potential rate of the system—since the relative intensity expresses potential intensity in the form of a percentage (1.00 quarter-cuts per day = 100%). The final figure states the actual amount of tapping over the given period.

Note: To calculate actual intensity (in quarter-cuts per day) multiply four times the *length of cut* in the formula by the *average number of tappings* per tree and divided by the *total number of days* in the given period (e.g. in the above example $4 \times \frac{1}{2} \times 167.3 \div 365 = 0.92$).

Height of Tapping and Bark consumption

Height of tapping and bark consumption may, when required, be appended to the formula, preceded by the symbol h, in the form described on page 155 of Communication No. 239 (*J.R.R.I.M.*, Vol. 9, 1939).

Kuala Lumpur,
1st May, 1940